



Lethality, Survivability, Mobility and Sustainment for America's Army



# ENHANCED-PORTABLE INDUCTIVE ARTILLERY FUZE SETTER (EPIAFS)

PRESENTED TO THE NDIA FUZE SYMPOSIUM  
APRIL 30, 2002



TOM WALKER  
ANDY LESHCHYSHYN



GPS satellite



Deploy Canards at Apogee



BIT:  
-Guide  
-Fail-safe



Post Apogee Trajectory  
Optimized for Range



Terminal Trajectory  
Optimized for  
Payload Type



Target

GPS Acquisition and Track

IMU  
Initialization



# EPIAFS to Support Excalibur XM982



**Inductive Setting**  
Gun/Target Locations  
GPS Data, Keys &  
Precise Time

Targeting



➤ Add GPS capability to M1155 PIAFS

# Enhanced - Portable Inductive Artillery Fuze Setter



## Standard Artillery Inductive Fuzes

M762 / M767 / M782 (MOFA)

**PIAFS**



AOP-22

- 32 bits of data
- 2 seconds data transfer
- 100% talk back of all data
- Confirmation of proper set

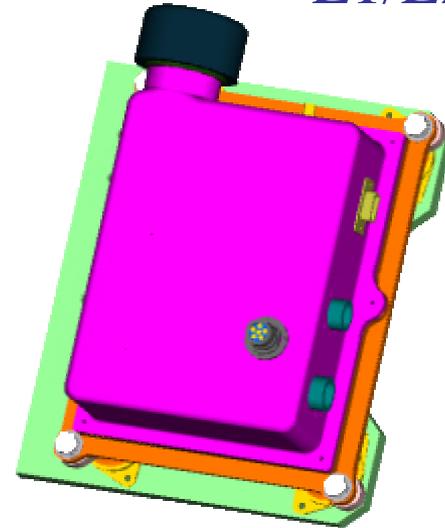
# INTRODUCTION TO IN-HOUSE EFFORT



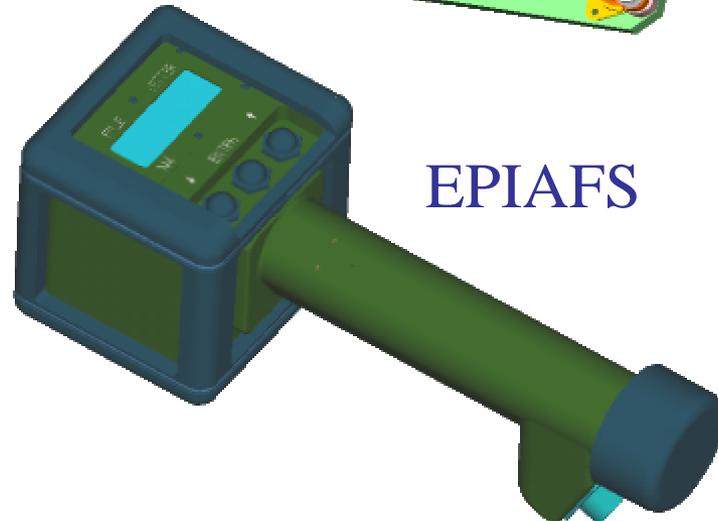
L1/L2 antenna

- Platform integration kit (PIK)
  - Single board computer
  - GPS receiver & antenna
  - Auxiliary circuits
  - Battery
  - Cables
  - LINUX OS & C++
- EPIAFS
- Software Interface Testers
- Plastic SLA Prototypes
- Draft ICD's
- GPS crypto-keys

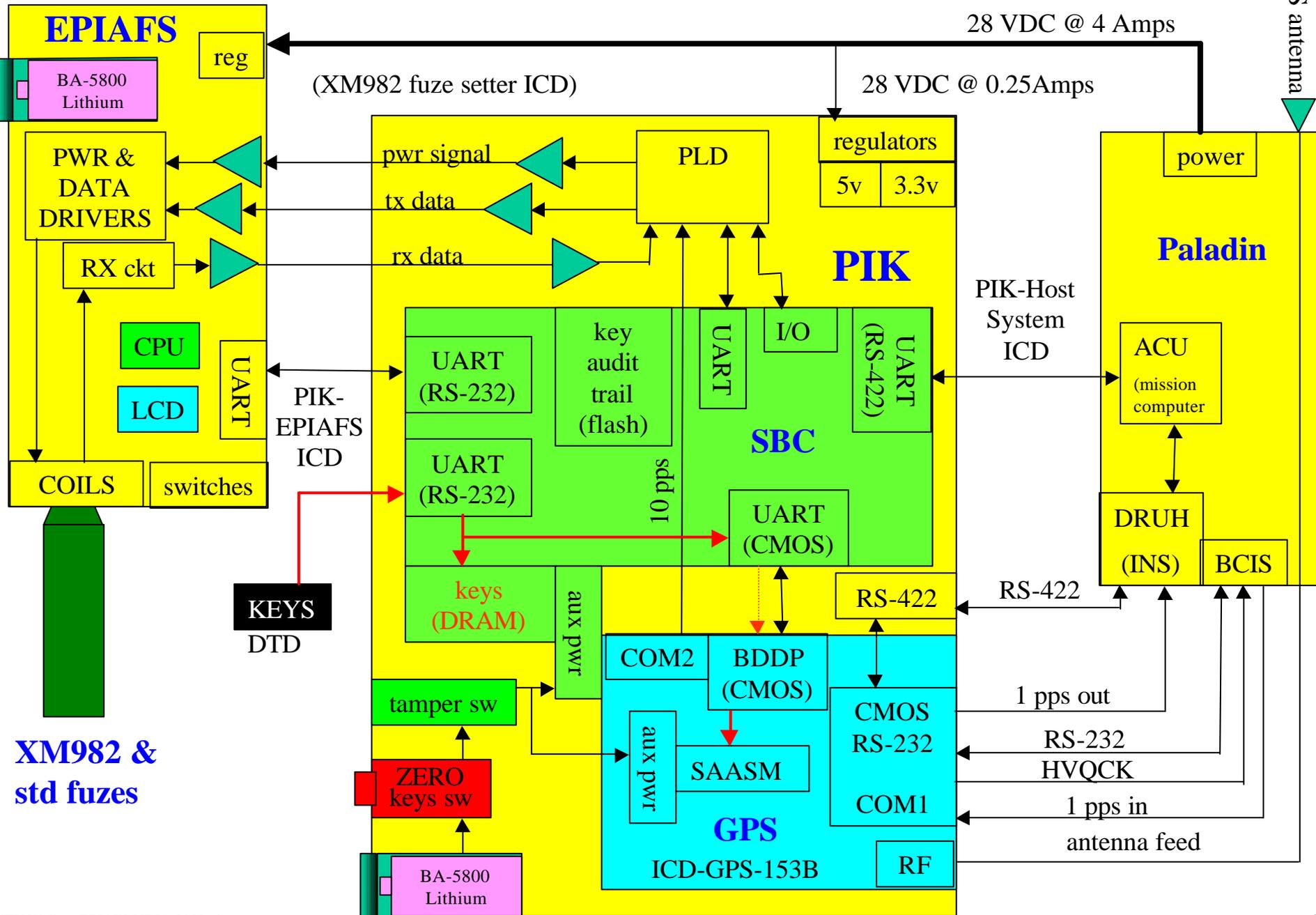
PIK



EPIAFS

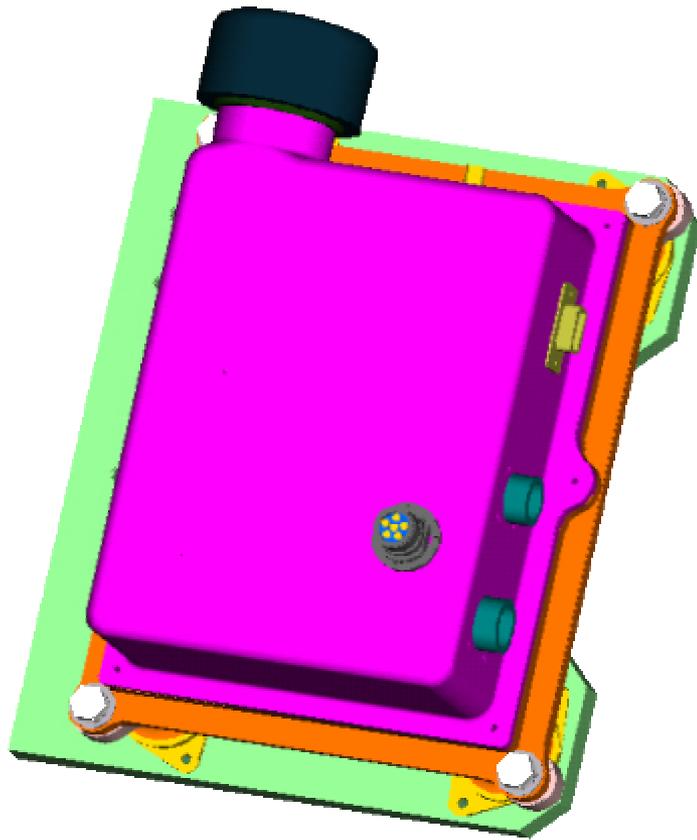


# EPIAFS/PIK BLOCK DIAGRAM

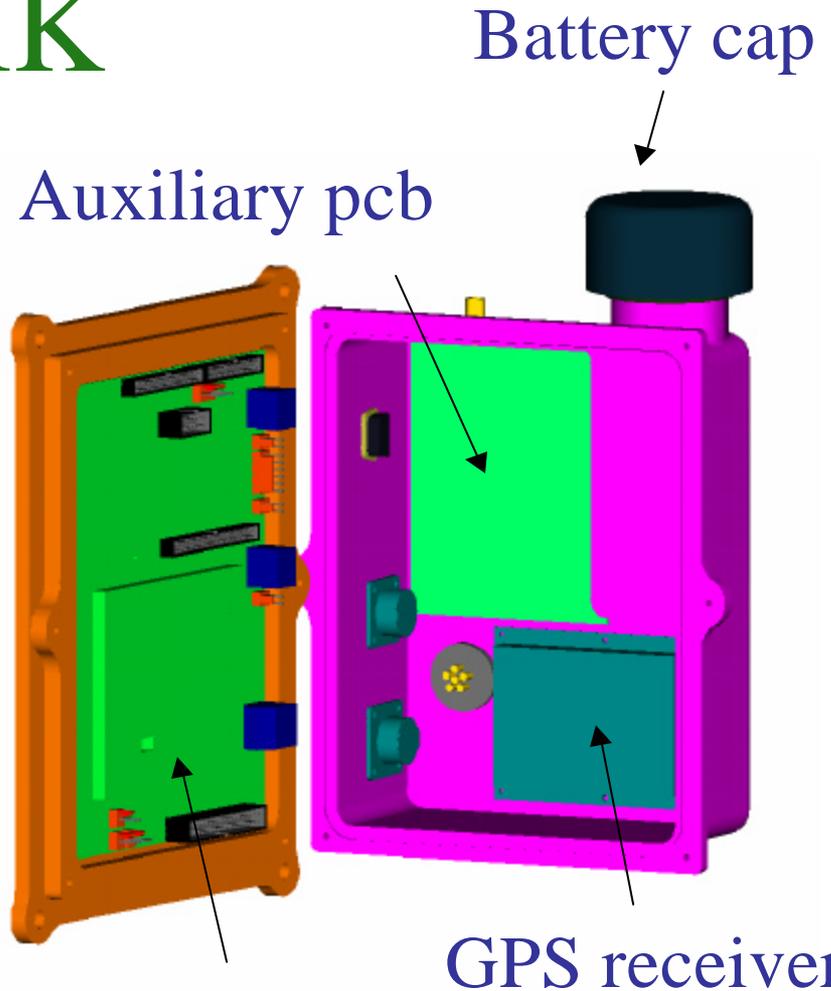


**XM982 & std fuzes**

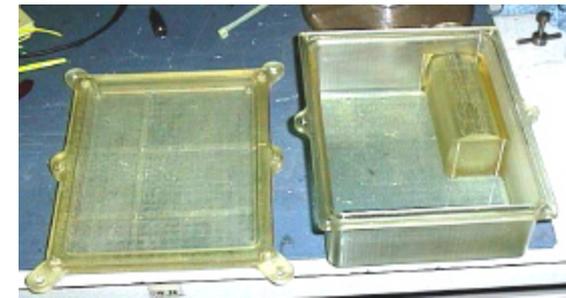
# PIK



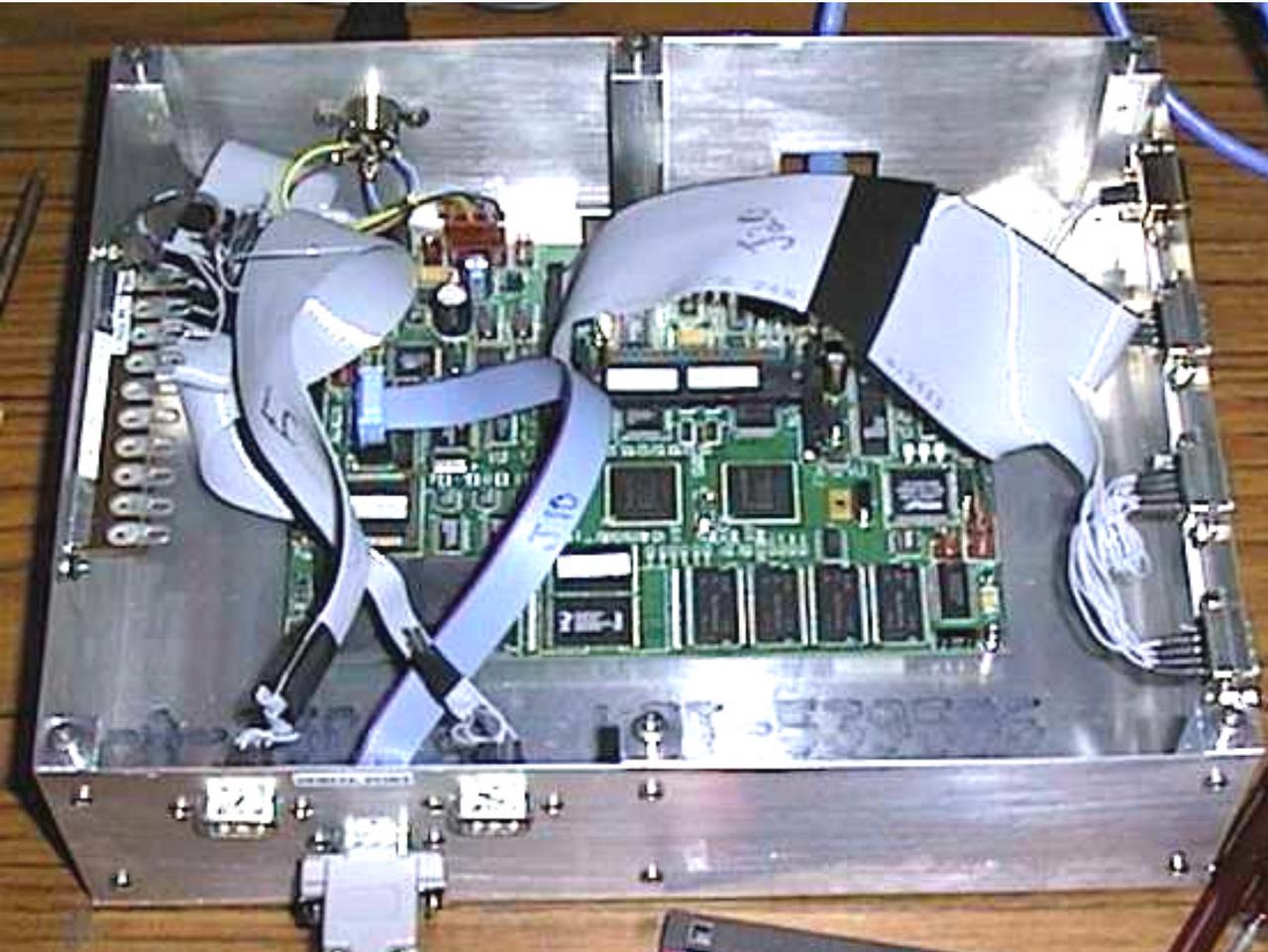
- 6 lbs
- 9"x7"x4" size
- 7 watts
- BA-5800 battery



SLA Model

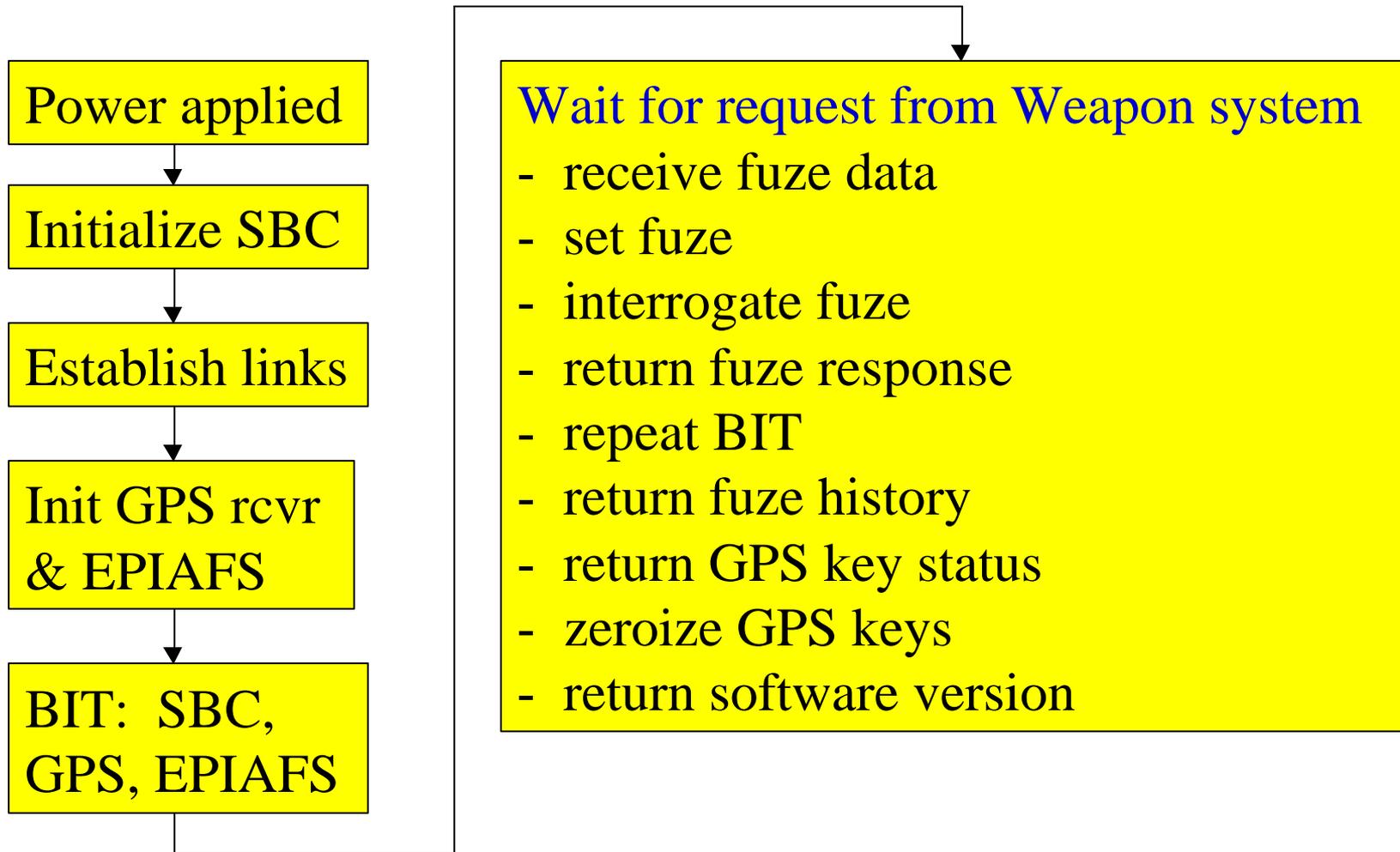


# PIK SINGLE BOARD COMPUTER



- COTS: ADS “Graphics Master”
- 3 watts
- 32M flash
- 32M DRAM
- 7 serial ports
- Ethernet
- 5”x7” size

# PIK ALGORITHM





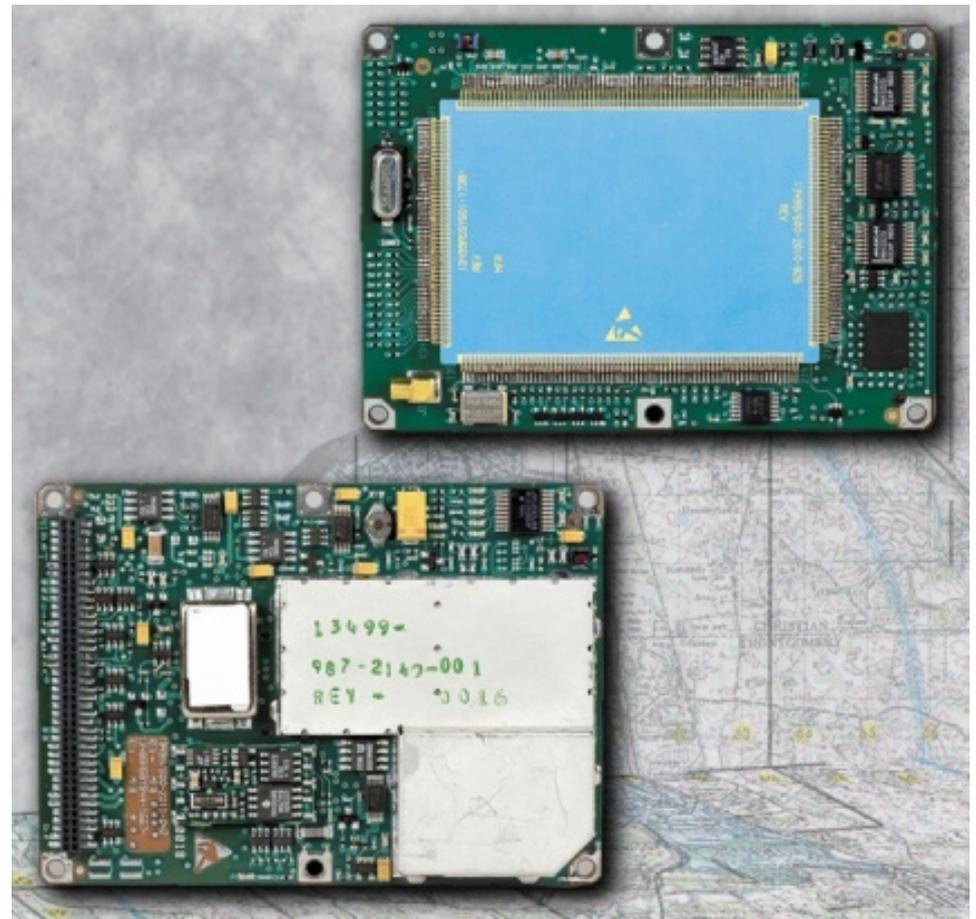
# PIK SOFTWARE DEVELOPMENT TEAM

- Host system interface
  - 1,100 lines
- EPIAFS interface
- XM982 interface
  - 2,900 lines
- GPS interface
  - 5,400 lines
- Crypto-key interface
  - 2,000 lines
- OS interface
  - 2,000 lines

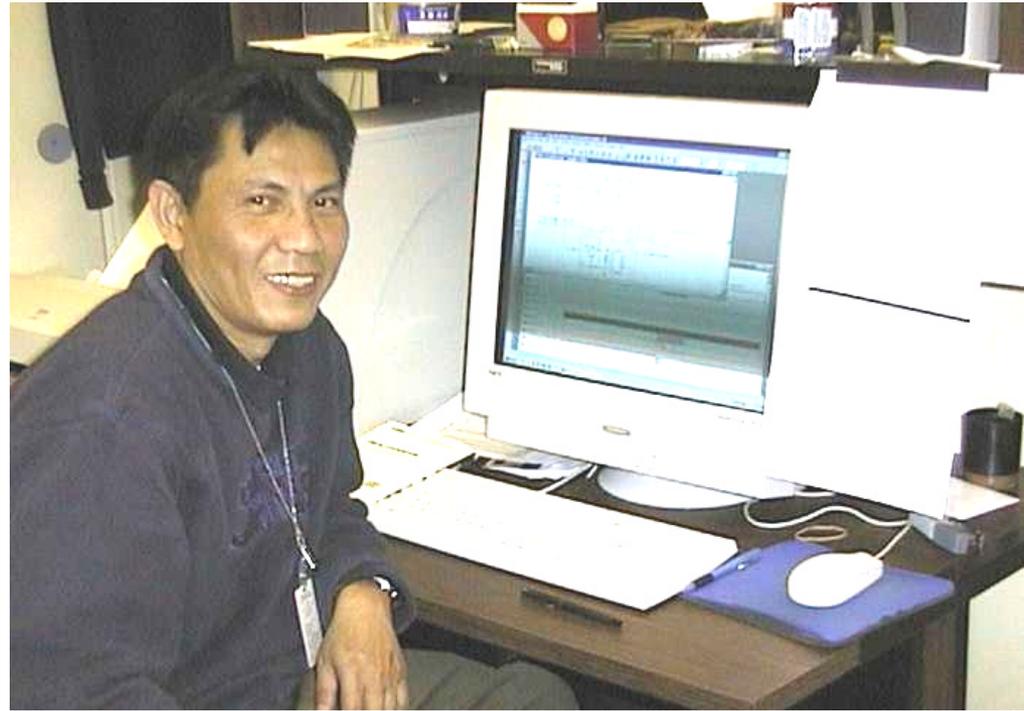
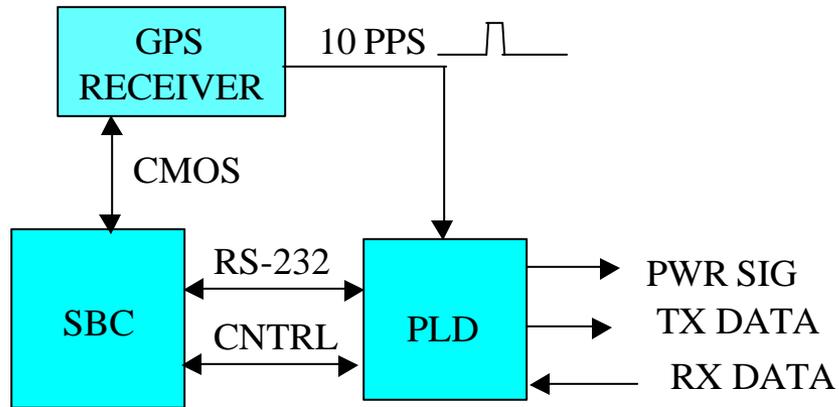
≈13k lines

# GPS RECEIVER

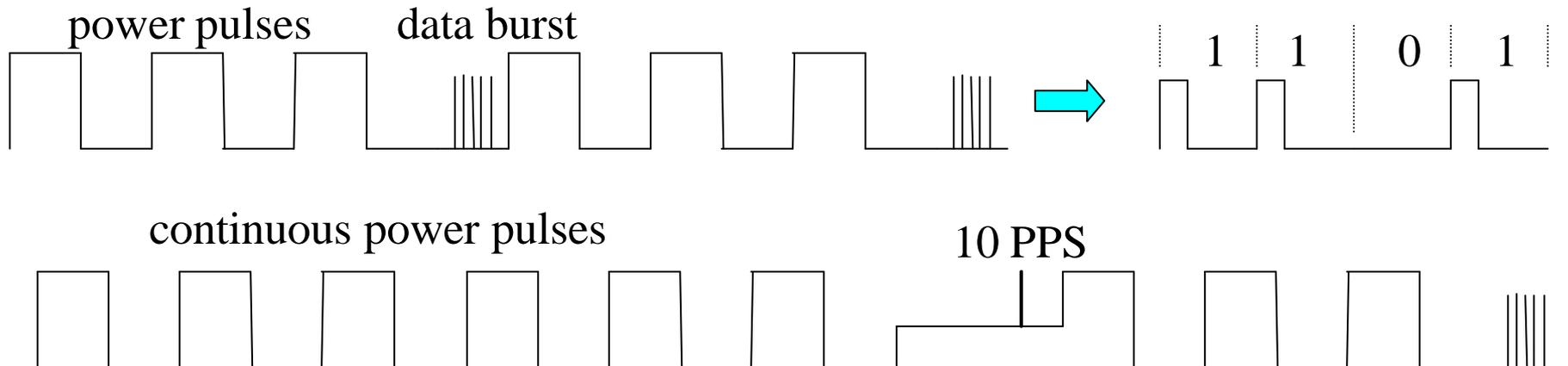
- Rockwell Collins “MPE-S”
- SSI GRAM with SAASM
- 12 channel, L1/L2
- ICD-GPS-153
- 1 pps & 10 pps
- 3.3 volts, 2 watts
- 3.5”x2.5”x0.6” size
- -40 to + 85 °C



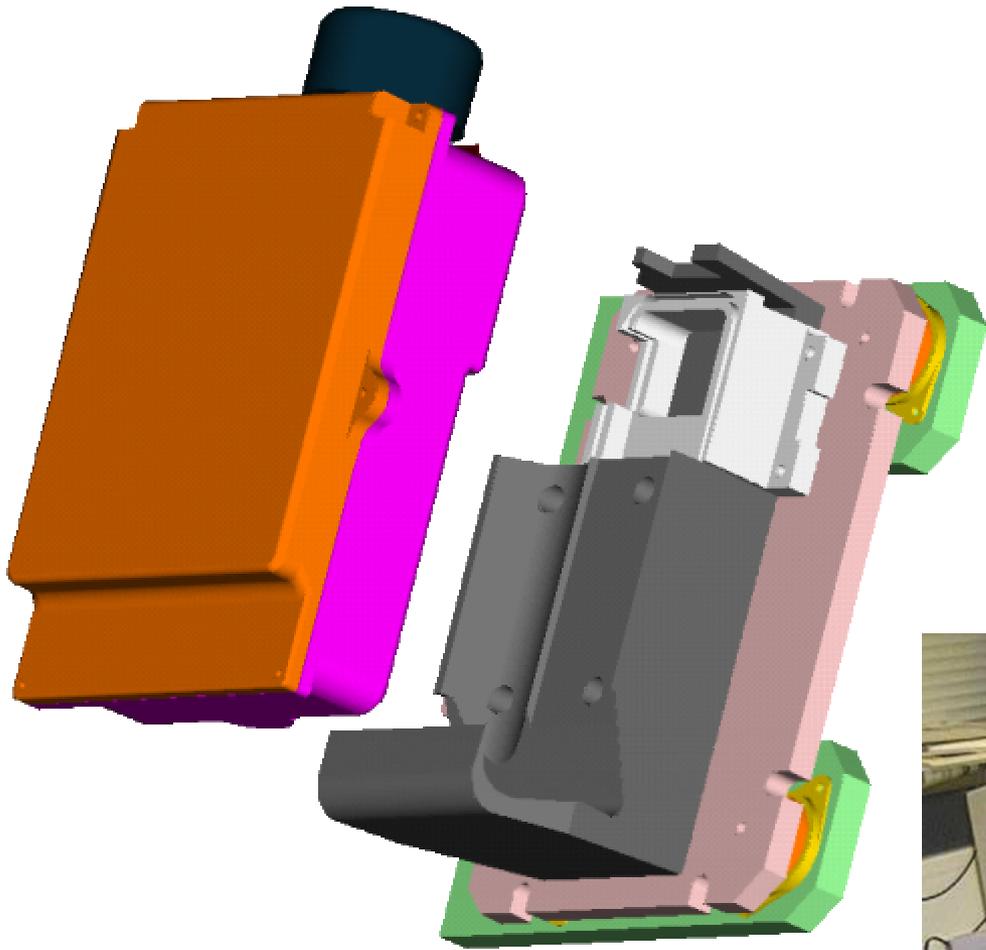
# PIK XM982 DATA CIRCUIT



## Contractor proposed TX/RX data format

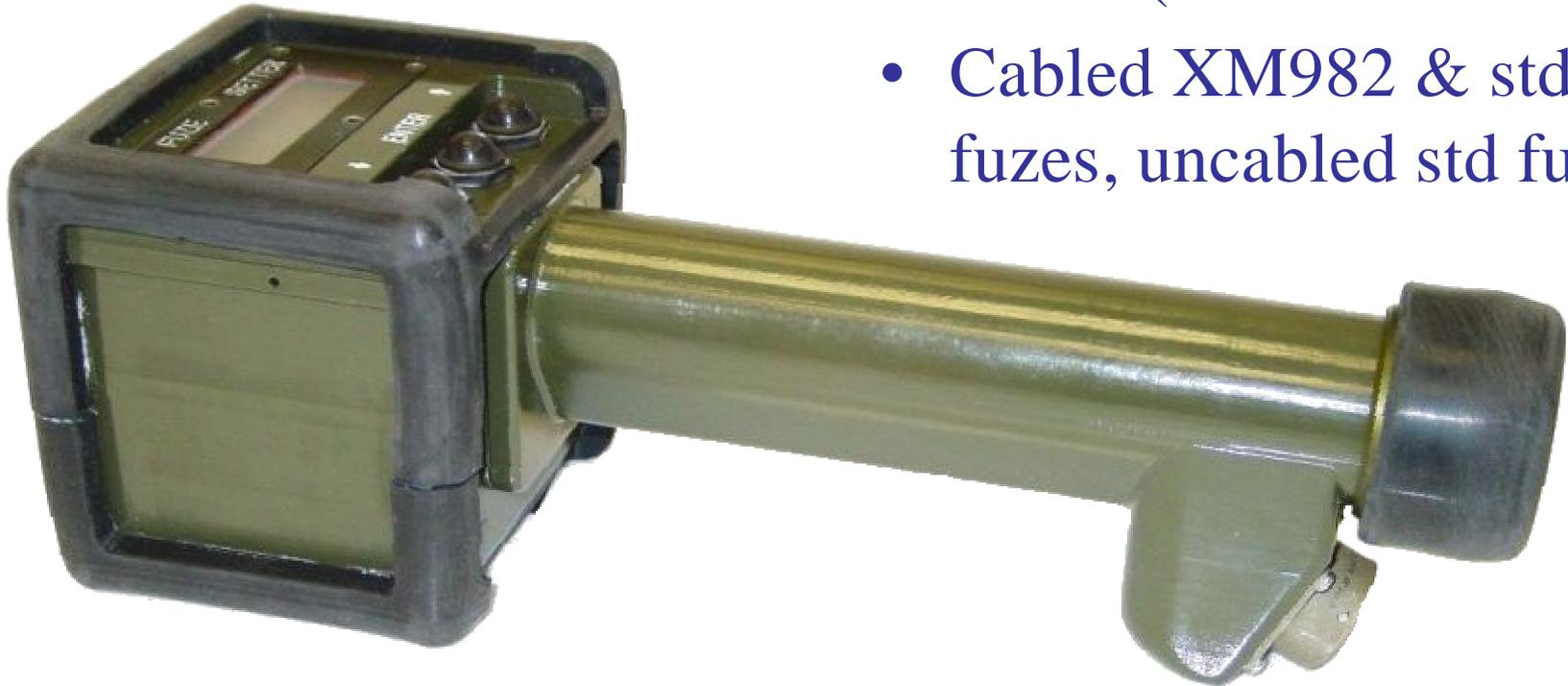


# PIK PACKAGE CONCEPT Using Existing PLGR Mount



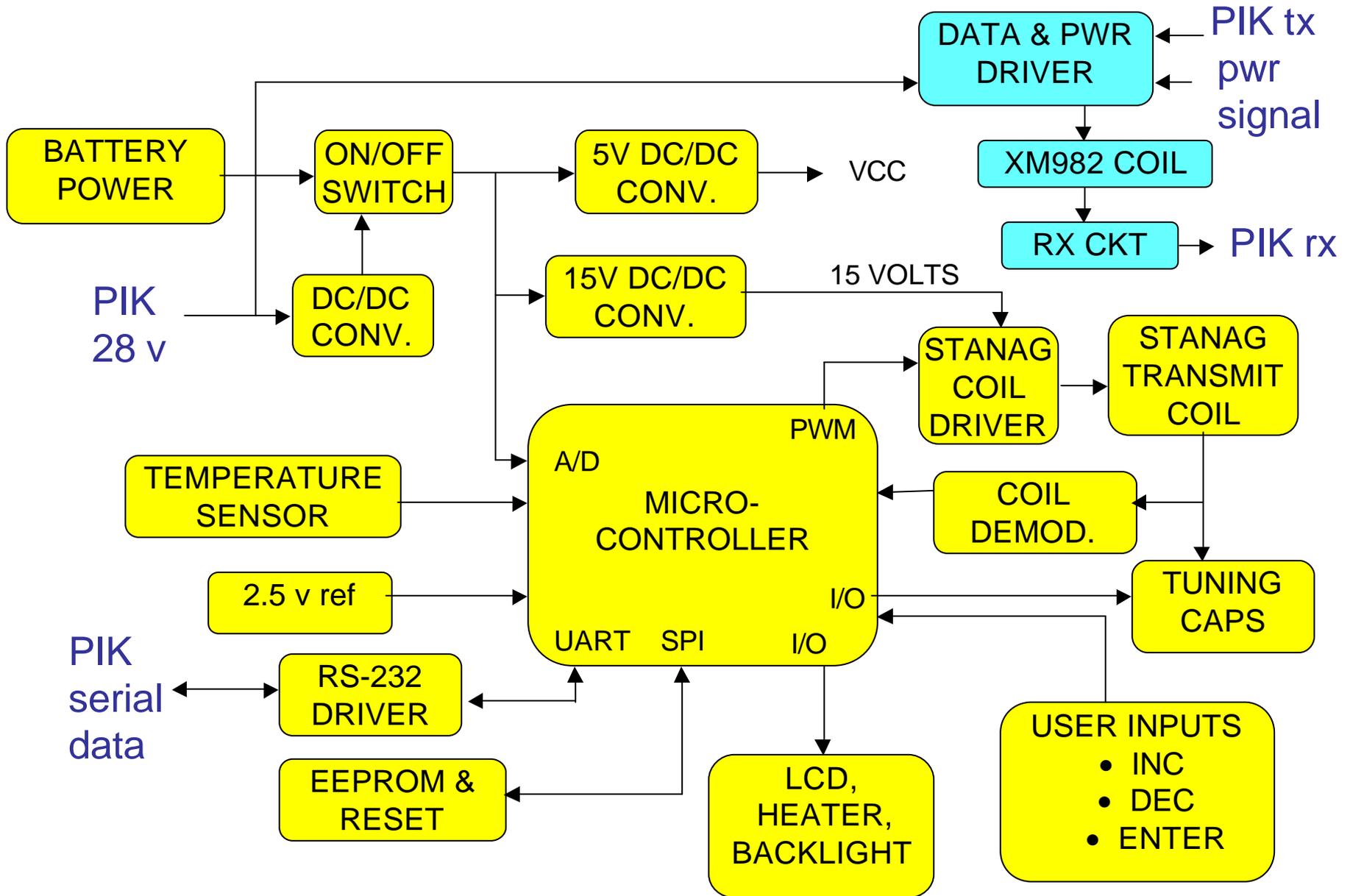
# EPIAFS

- 4.5 lbs, 12”x4.5”x4.5”
- Alkaline and BA-5800
- Flash micro
- 1 watt (+ 4 watts heater)
- Cabled XM982 & std fuzes, uncabled std fuzes

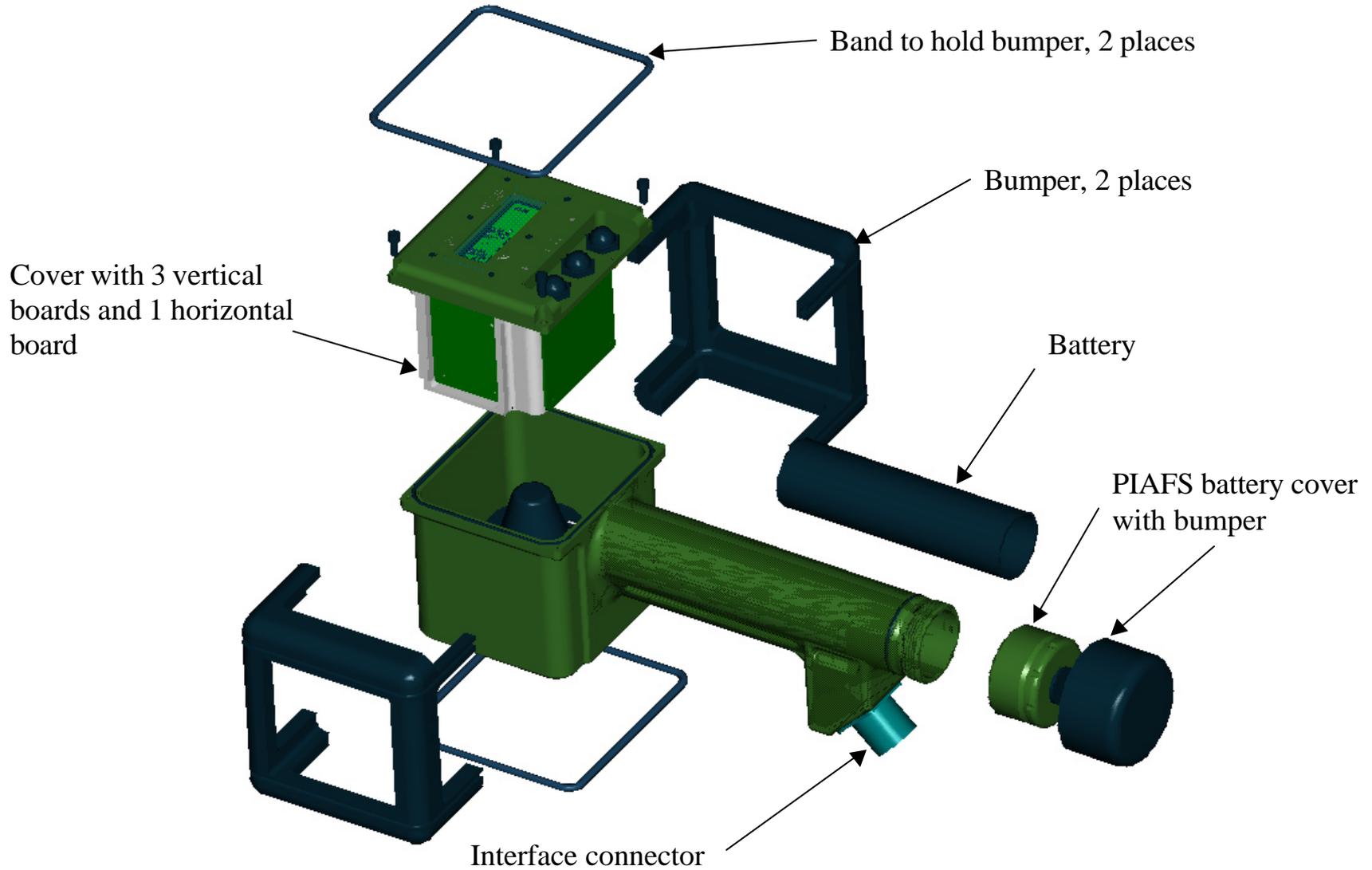


Stereo lithography model

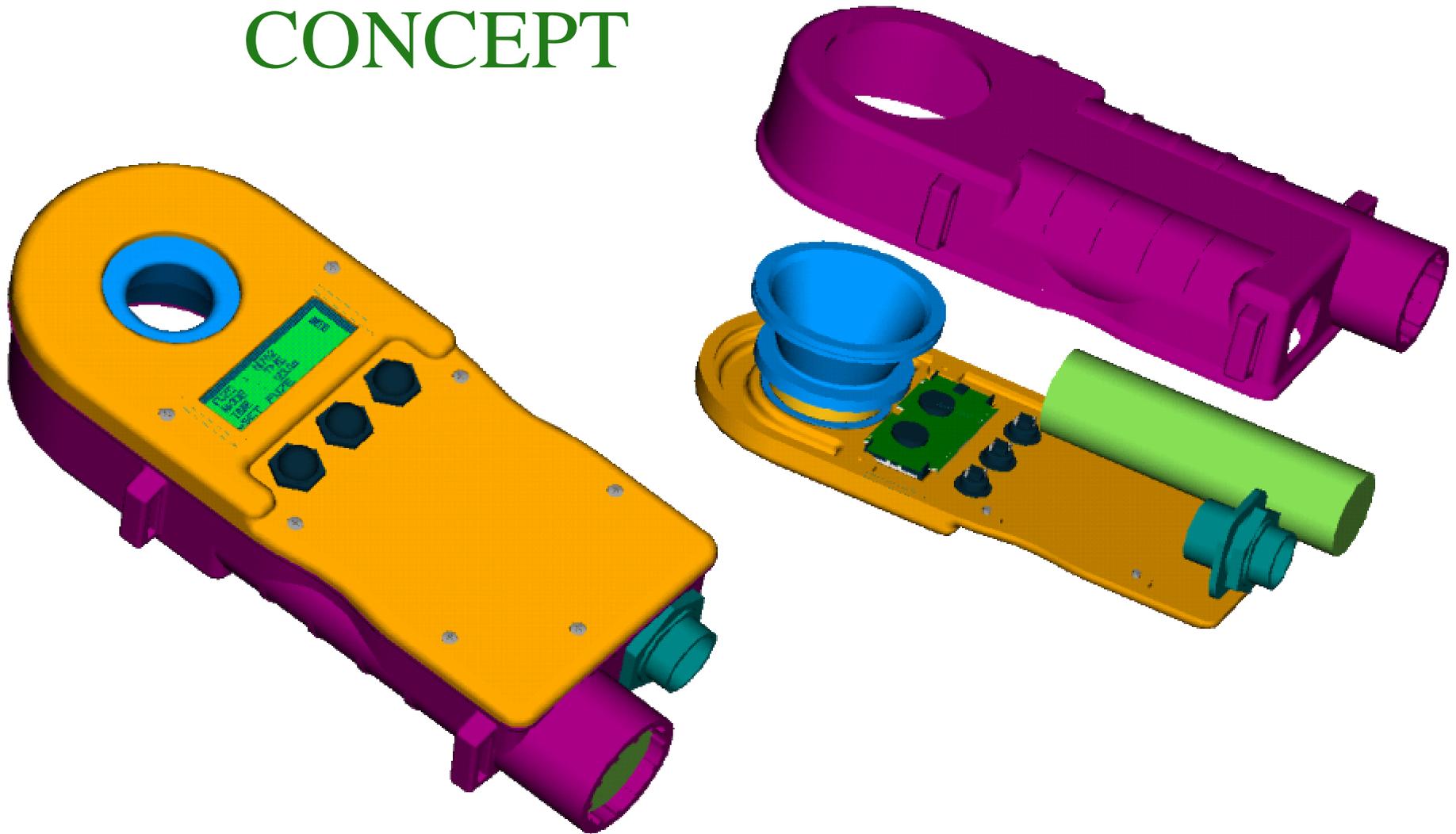
# EPIAFS BLOCK DIAGRAM



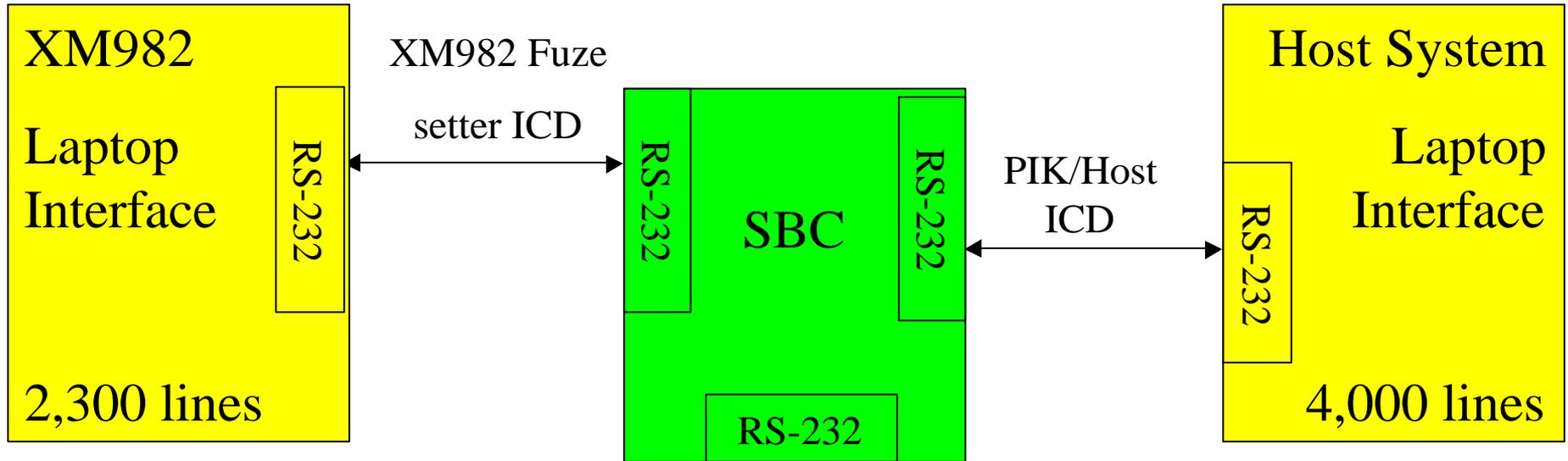
# EPIAFS Exploded View



# EPIAFS PACKAGE CONCEPT

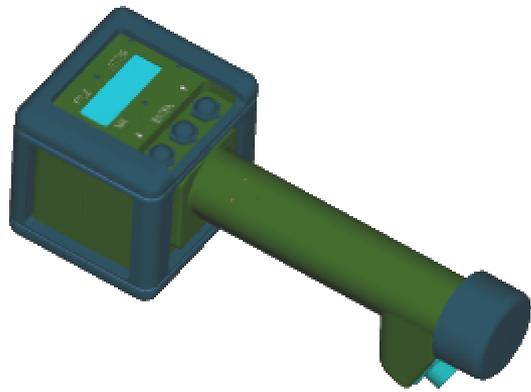


# SOFTWARE INTERFACE TESTERS

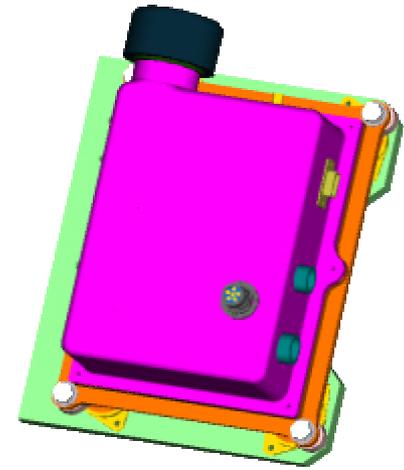


# PLANS

- Demonstrate XM982 serial interface
- Demonstrate PIK/EPIAFS brass-board
- Update PIK & EPIAFS design
- Deliver prototype setters
- User human factor evaluations
- Assist PIK integration in Crusader
- Update ICD's



# CONCLUSION



- PIK/EPIAFS concept generated
- PIK baseline software demonstrated
- Fabricated PIK & EPIAFS SLA models
- Early user involvement in HFE evaluation
- Graphics Master SBC running
- Host & XM982 interface testers
- Draft ICD's